

AMENDMENT UNDER 37 C.F.R. §1.111  
U.S. Application No. 09/765,995

**REMARKS**

Applicants thank the Examiner for acknowledging their claim to benefit under 35 U.S.C. §120.

Applicants also thank the Examiner for acknowledging acceptance of the drawings filed on June 25, 2002.

Claims 96-105 are all the claims pending in the application.

The Examiner has objected to the specification, based on one of the Preliminary Amendments which Applicants filed. Upon a review of the file, Applicants note that they inadvertently had based the "Preliminary Amendment B" to which the Examiner refers on the originally-filed specification, rather than on the substitute specification. The foregoing specification amendments correct this oversight.

The Examiner has objected to the title of the invention. The foregoing change is believed to make the title more descriptive.

Claim 104 stands rejected under U.S.C. §112, second paragraph, for insufficient antecedent basis. The foregoing amendment to claim 104 corrects the antecedence problem.

Claims 96, 100, 101, 104 and 105 stand rejected under 35 U.S.C. §102(b) as being anticipated by Ohtombe et al (USP 4,764,969). Claim 97 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe. Claim 98 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe in view of Maeda et al. (USP 4,791,586). Claims 99 and 102 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe in view of

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Maeda, and further in view of Sandland (USP 4,618,938). Claim 103 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ohtombe in view of Sandland. Applicants respectfully traverse this rejection, pursuant to a telephone interview with the Examiner on October 28, 2002, and request reconsideration and allowance of the claims pursuant to the following discussion.

In reviewing the Examiner's rejection, Applicants noticed that both independent claim 96 of the present application and claim 6 (application claim 128) of USP 6,178,257, parent of the present application, contain similar recitations. The Examiner of the '257 patent had rejected application claim 128 based on the Ohtombe reference on which the Examiner relied here. Applicants traversed that prior art rejection in the '257 patent prosecution successfully, and requested an interview with the Examiner in charge of the present application to point this out.

During a telephone interview with the Examiner on October 28, 2002, as reflected in the Examiner Interview Summary Record, Applicant and the Examiner reached agreement on this point. Accordingly, Applicants are filing a Terminal Disclaimer concurrently with this response, and thus believe that they have done what is necessary to place this application in condition for allowance.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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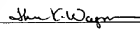
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Date: December 11, 2002

Signed: Thea K. Wagner 

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**APPENDIX**

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE TITLE:**

Please amend the title to read as follows:

OPTICAL INSPECTION APPARATUS FOR SUBSTRATE DEFECT DETECTION

**IN THE SPECIFICATION:**

Please delete the paragraph bridging pages 2-3, and replace it with the following new paragraph:

According to one aspect of the present invention, there is provided a method of inspecting the surface of [articles] an article for defects[, comprising] by: [placing the article to be inspected on a table; in a first phase,] optically examining, in a first phase examination, the complete surface of the article [on the table at a relatively high speed and with a relatively low spatial resolution;] and electrically outputting information indicating [suspected] locations on the article suspected of having [a high probability of a defect] defects; storing the [outputted information] suspected locations in a storage device; and, in a second phase examination, [while the article is still on the table,] optically examining with [a relatively] high [spatial] resolution only the suspected locations of the article's surface for determining the presence of or absence of a defect in the suspected locations; characterized in that the first phase examination is effected by optically scanning the complete surface of the article at a high speed with an optical beam of small diameter. Thus, by selecting the diameter of the optical beam used in the first phase

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examination, the first phase examination may be made at any desired resolution, as compared to the second phase examination, according to the particular application [stored in the storage device for the presence or absence of a defect in the suspected locations].

**Page 3, please delete the first full paragraph, and replace it with the following new paragraph:**

According to further features of the invention, the first examining phase is effected by optically scanning the complete article surface to be inspected with a laser beam of small diameter; and the second examining phase is automatically effected immediately after the first phase by imaging only the suspected locations on [a] an image converter which converts the images to electrical signals and then analyzes the electrical signals.

**Page 3, please delete the second full paragraph, and replace it with the following new paragraph:**

According to still further features in preferred embodiments of the invention described below, the surface of the article to be inspected includes a pattern, e.g., a patterned wafer used for producing a plurality of integrated-circuit dies or chips. The first [examining] examination phase is effected by making a comparison between the inspected pattern and another pattern, serving as a reference pattern, to identify locations on the inspected pattern wherein there are sufficient differences with respect to the reference pattern to indicate a high probability of a defect in the inspected pattern. The second [examining] examination phase is also effected by

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making a comparison between the inspected pattern and the reference pattern, to identify locations on the inspected pattern wherein the comparison shows sufficient differences with respect to the reference pattern to indicate the presence of a defect in the suspected location of the inspected pattern.

**Page 4, please delete the first full paragraph, and replace it with the following new paragraph:**

It will thus be seen that the novel method of the present invention primarily monitors changes in the defect density while maintaining a high throughput with a relatively low false alarm rate. Thus, the first examination is done at a relatively high speed and with a relatively low spatial resolution such as with a laser beam of small diameter to indicate only suspected locations having a high probability of a defect; and the second examination is done with a relatively high spatial resolution but only with respect to the suspected locations having a high probability of a defect. The sensitivity of the two phases may be adjusted according to the requirements for any particular application. Thus, where the application involves a relatively low number of defects, the sensitivity of the first examination phase may be increased by using a very small diameter laser beam to detect very small defects at a high speed but at the expense of an increased false alarm rate. However, since only relatively few suspected locations are examined in the second phase, the overall inspection can be effected relatively quickly to enable the fabrication personnel to identify defects caused by any process or equipment, and to immediately correct the cause for such defects.

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**Page 4, please delete the second full paragraph, and replace it with the following new paragraph:**

According to a further feature of the invention, the first examining phase is effected by generating a first flow of N different streams of data representing the pixels of different [images] views of the inspected pattern unit; generating a second flow of N different streams of data representing the pixels of different [images] views of the reference [pattern unit]; and comparing the data of the first flow with the data of the second flow to provide an indication of the suspected locations of the inspected [pattern unit] surface of the article having a high probability of a defect.

**IN THE CLAIMS:**

**The claims are amended as follows:**

104. (Amended) The apparatus of claim 96, further comprising an image processor receiving an output of said [image sensor] second collection optics and outputting said images.